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(71) Applicant

Canon Kabushiki Kaisha

(Incorporated in Japan)

30-2 3-chome, Shimomaruko, Ohta-ku,  
Tokyo, Japan

(72) Inventor

Masaaki Inde

(74) Agent and/or Address for Service

Beresford & Co

2-5 Warwick Court, High Holborn, London,  
WC1R 5DJ, United Kingdom

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(56) Documents cited

EP 0483969 A2

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JP 030030571 A

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(58) Field of search

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INT CL<sup>5</sup> H04N 1/32 1/40

Online databases: WPI

(54) Facsimile with transmission resolution matched to receiving resolution

(57) A transmitting facsimile determines the resolution(s) acceptable to a receiving facsimile from the handshaking procedure (figure 5) carried out at the start of communication. If the transmitting and receiving resolutions do not match, resolution conversion 15 takes place and the resolution actually used for transmission is displayed 7, at least when resolution conversion has taken place. The original to be transmitted is scanned 2 at the highest resolution and the image data stored 14 prior to transmission and resolution conversion. If a plurality of receiving resolutions are acceptable, the highest receiving resolution lower than the original reading resolution is chosen.

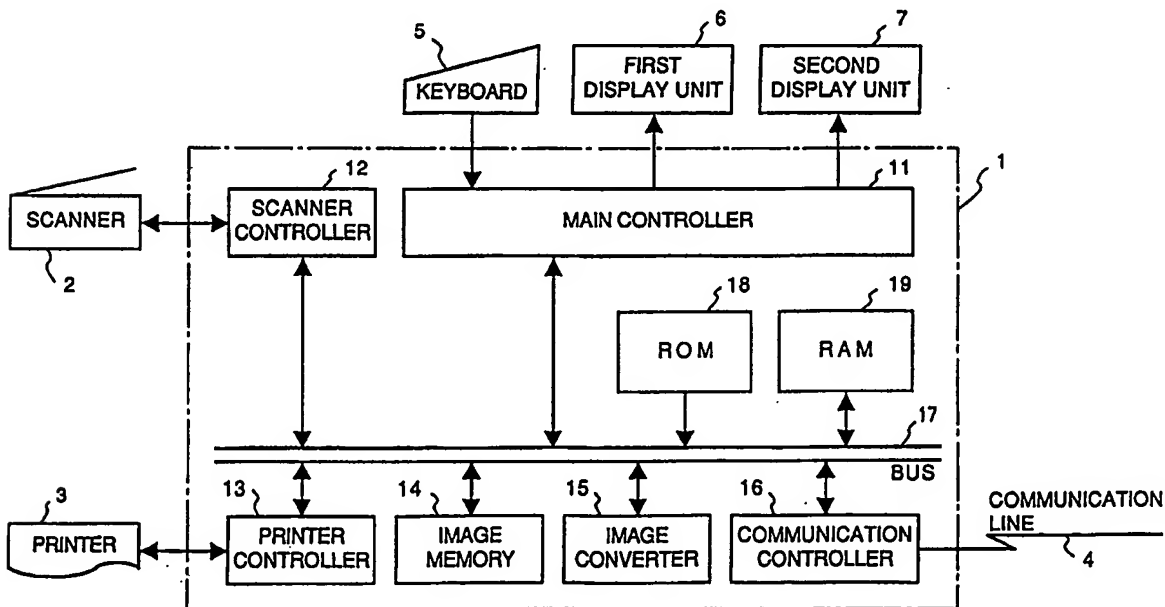


FIG. 1

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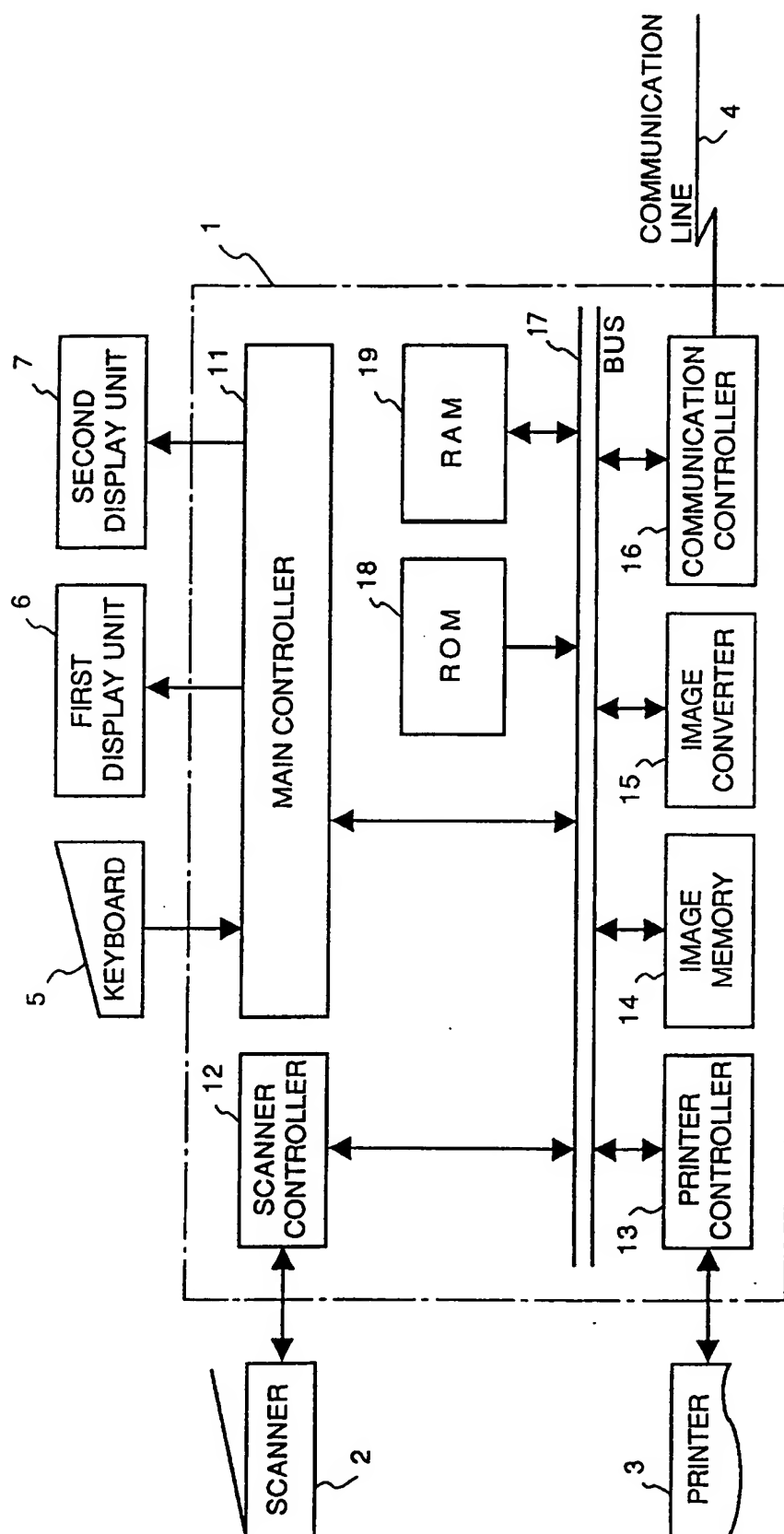


FIG. 1

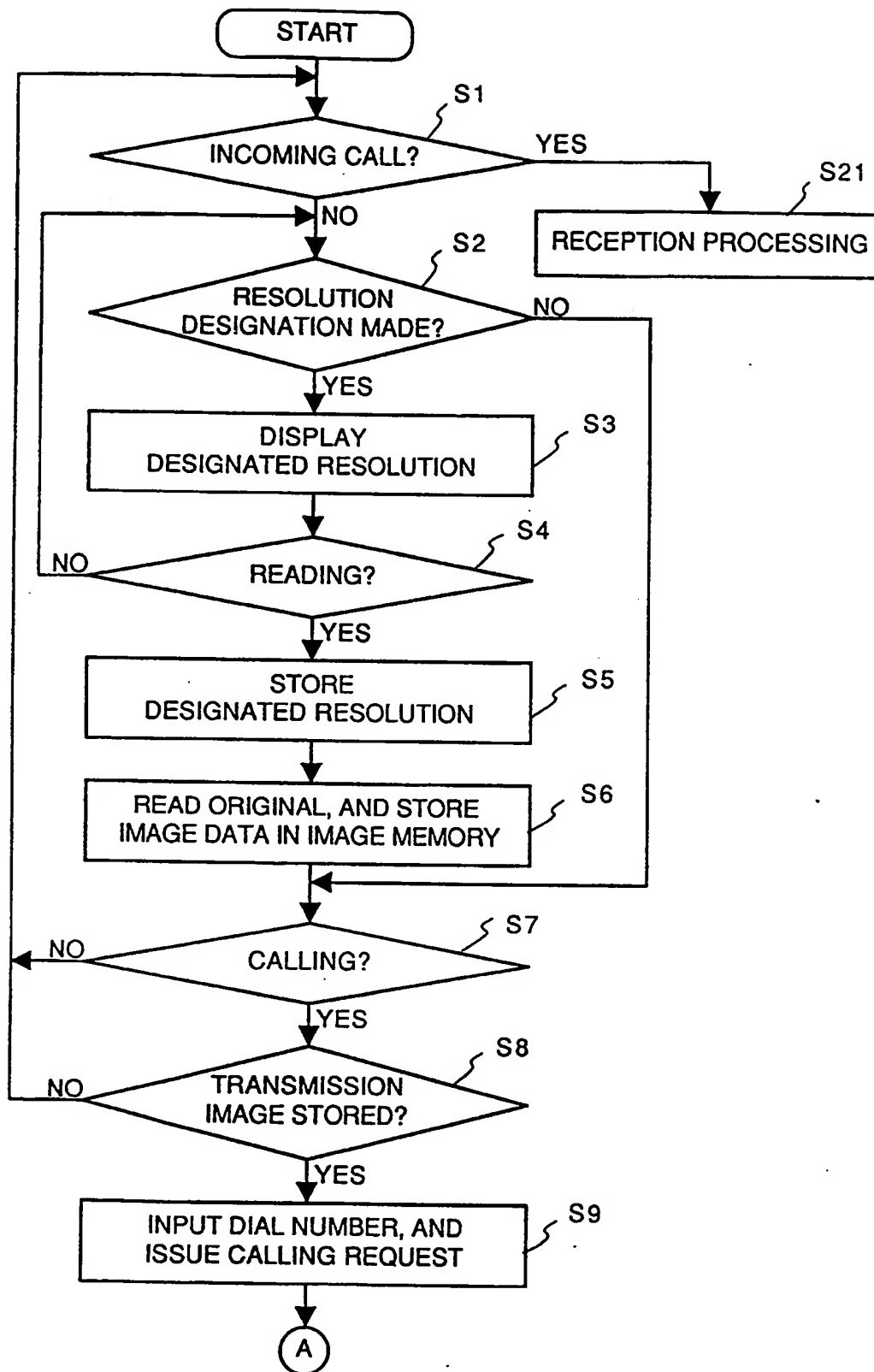


FIG. 2

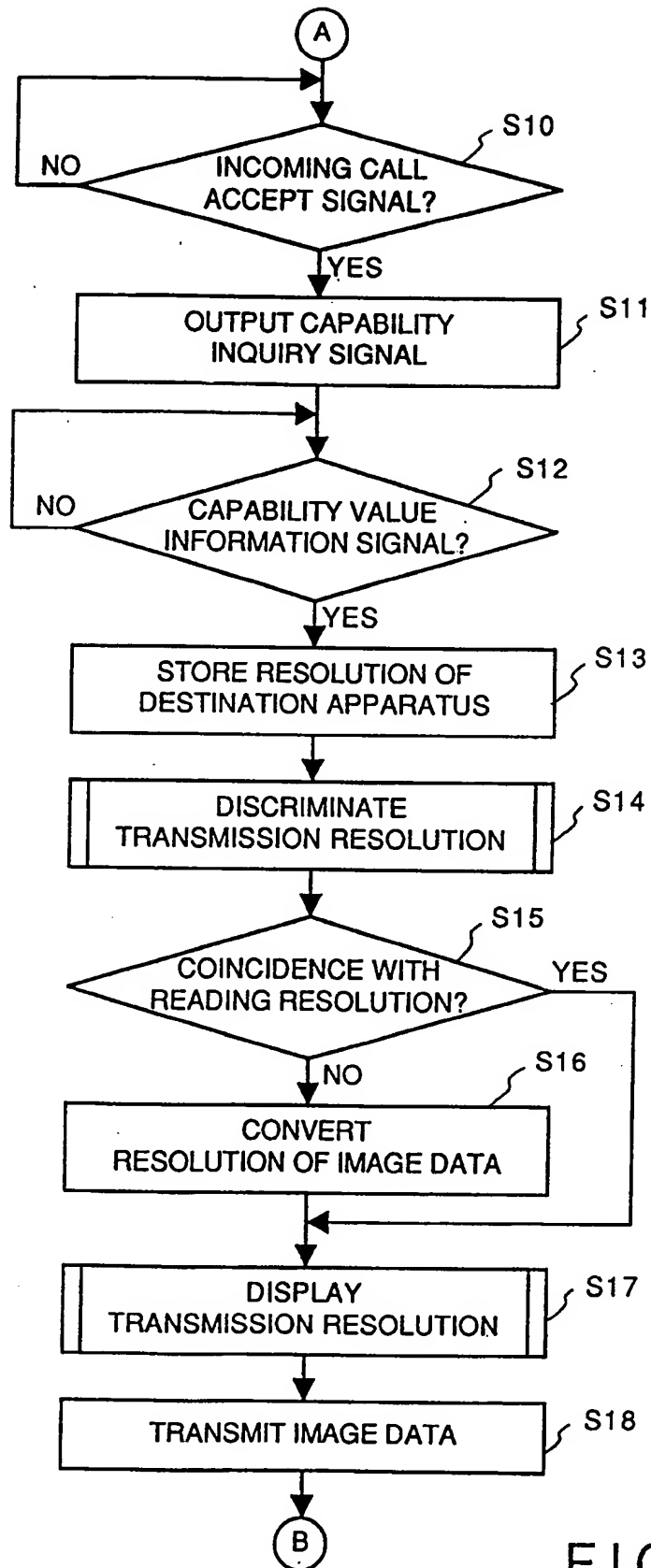


FIG. 3

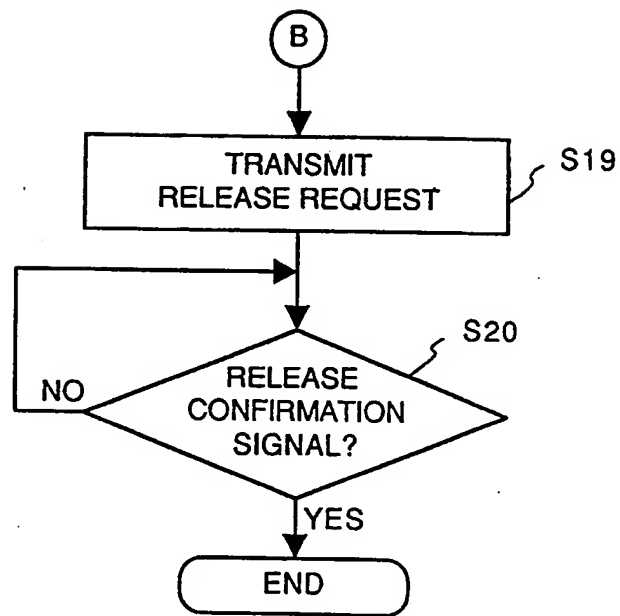


FIG. 4

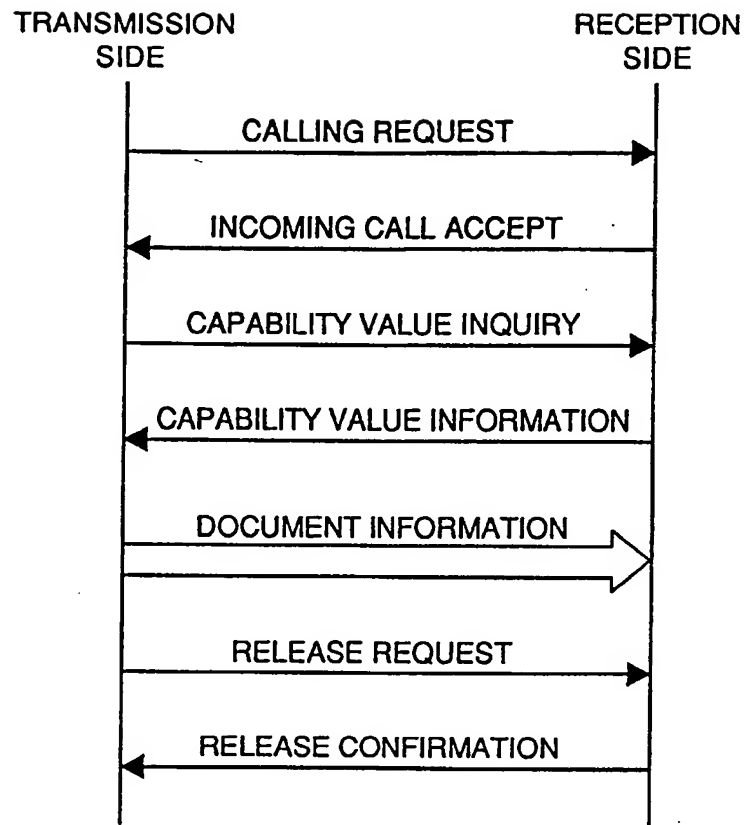


FIG. 5

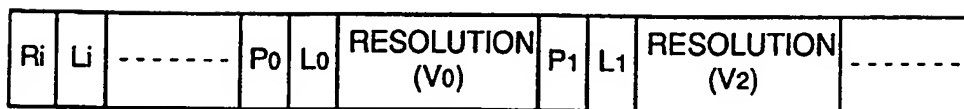


FIG. 6

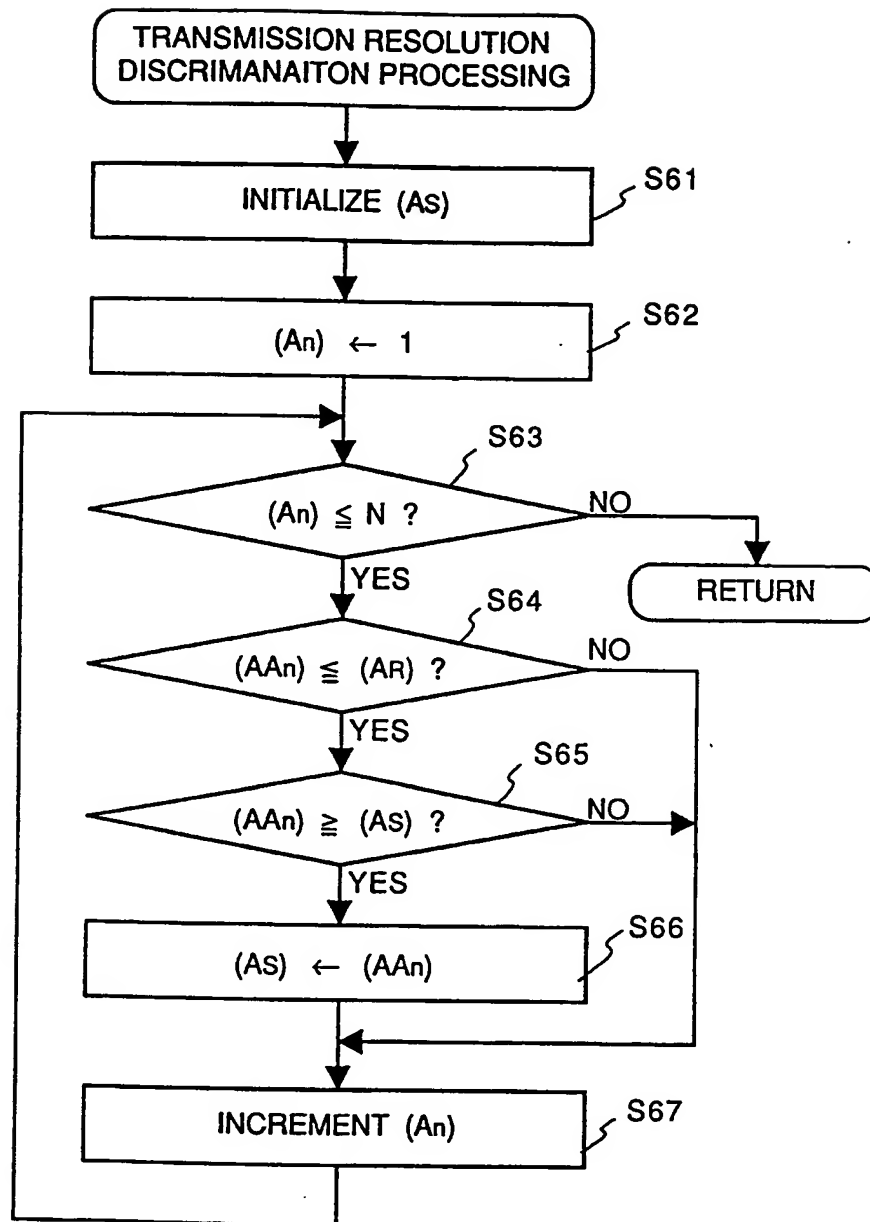


FIG. 7

ADDRESS	CONTENT	
⋮	⋮	
A <sub>R</sub>	READING RESOLUTION INFORMATION	41
A <sub>S</sub>	TRANSMISSION RESOLUTION INFORMATION	42
⋮	⋮	
A <sub>1</sub>	RECEPTION POSSIBLE RESOLUTION INFORMATION (1)	43
A <sub>2</sub>	RECEPTION POSSIBLE RESOLUTION INFORMATION (2)	
⋮	⋮	
A <sub>N</sub>	RECEPTION POSSIBLE RESOLUTION INFORMATION (N)	
⋮	⋮	
A <sub>n</sub>	RECEPTION POSSIBLE RESOLUTION INDEX	44

FIG. 8



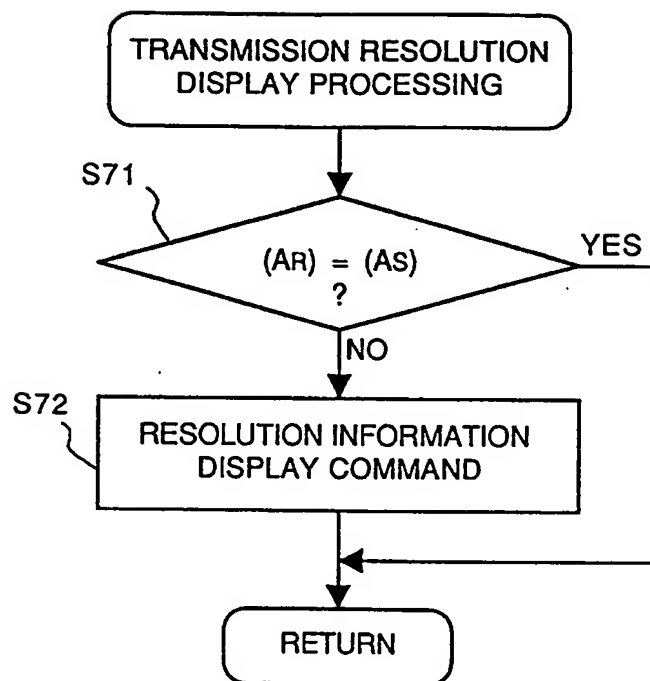


FIG. 9

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TITLE OF THE INVENTION

## FACSIMILE APPARATUS

BACKGROUND OF THE INVENTION

The present invention relates to a facsimile  
5 apparatus, which changes the transmission resolution in  
correspondence with the resolution at a reception side.

In recent years, many facsimile apparatuses have  
optional resolutions, which are permitted to use, in  
advance as well as a standard resolution as transmission  
10 or reception possible resolutions.

On the other hand, some facsimile apparatuses have  
a function of temporarily storing read document  
information in a memory, and then transmitting the  
stored document information, and sequentially use the  
15 stored document information in, e.g., a multi-address  
communication mode.

In a general communication procedure of a facsimile  
communication, setting of a call, identification of  
capability (e.g., a resolution) of a facsimile apparatus  
20 on the other end of a line, transfer of document  
information, release of a call, and the like are  
executed. Of these operations, in identification of the  
capability of the facsimile apparatus on the other end  
of the line, a transmission-side facsimile apparatus  
25 identifies information indicating a reception possible  
resolution, which information is sent from a reception-

side facsimile apparatus. In transfer of document  
information, document data having a resolution other  
than the resolution indicated by the resolution  
information as the capability of a facsimile apparatus  
5 on the other end of the line must not be transmitted.

Therefore, in a facsimile apparatus which  
temporarily stores read document information in a  
memory, and then transmits the stored document  
information, when document information to be transmitted  
10 is converted into one having a resolution different from  
a reading resolution, the reading resolution does not  
often coincide with that of document information to be  
actually transmitted.

In the conventional facsimile apparatus, means for  
15 informing the resolution of document information to be  
actually transmitted to an operator is insufficient.  
For this reason, the operator cannot confirm whether or  
not document information is transmitted at a desired  
resolution.

20 Even when a display unit for displaying the  
resolution of document information is arranged on a  
facsimile apparatus, and a transmission resolution is  
displayed on the display unit, since a reading  
resolution and the transmission resolution cannot be  
25 displayed at the same time, an operator cannot

adequately recognize whether or not the reading resolution is changed upon transmission.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide  
5 a facsimile apparatus which displays a transmission resolution when a resolution of read document information does not coincide with the transmission resolution, whereby an operator can be clearly informed of a coincidence/non-coincidence between the reading  
10 resolution and the transmission resolution.

In order to achieve the above object, according to the present invention, a facsimile apparatus for reading an original at a designated resolution, comprises means for identifying a reception possible resolution of a  
15 reception-side facsimile apparatus, discrimination means for discriminating whether or not a designated original reading resolution coincides with the reception possible resolution, conversion means for, when the discrimination means determines that the two resolutions  
20 do not coincide with each other, converting the designated original reading resolution into the reception possible resolution, and display means for displaying the converted resolution as a transmission resolution.

25 It is preferable that the conversion means determines a maximum value of reception possible

resolutions, which value does not exceed the original reading resolution, as the reception possible resolution.

It is also preferable that the display means  
5 displays the transmission resolution only when the reception possible resolution does not coincide with the designated original reading resolution.

Other features and advantages of the present invention will be apparent from the following  
10 description taken in conjunction with the accompanying drawings, in which like reference characters designate the same or similar parts throughout the figures thereof.

#### BRIEF DESCRIPTION OF THE DRAWINGS

15 Fig. 1 is a block diagram showing an arrangement of a facsimile apparatus according to an embodiment of the present invention;

Figs. 2, 3, and 4 are flow charts showing a control procedure in the facsimile apparatus according to the  
20 embodiment;

Fig. 5 is a chart showing a signal sequence in the facsimile apparatus;

Fig. 6 shows a format of resolution information included in a capability value information signal;

25 Fig. 7 is a detailed flow chart of transmission resolution discrimination processing;

Fig. 8 is a view showing the internal arrangement of a RAM for storing resolution information; and

Fig. 9 is a detailed flow chart of transmission resolution display processing.

5     DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The preferred embodiment according to the present invention will be described in detail hereinafter with reference to the accompanying drawings.

Fig. 1 is a block diagram showing an arrangement of  
10 a facsimile apparatus according to an embodiment of the present invention. In Fig. 1, a facsimile apparatus is constituted by a main body 1, a scanner 2, a printer 3, a communication line 4, a keyboard 5 for performing various operations, a first display unit 6 for  
15 displaying a reading resolution, and a second display unit 7 for displaying a transmission resolution, and other messages.

The facsimile apparatus main body 1 is constituted by a main controller 11 for performing control of the  
20 overall apparatus and other control operations, a scanner controller 12, a printer controller 13, an image memory 14 having a capacity capable of storing a predetermined amount of image data, an image converter  
15 for performing pixel density conversion and compression/expansion of image data, a communication  
25 controller 16, a data bus 17, a ROM 18 for storing,

e.g., a control program, and a RAM 19 for storing values indicating a reading resolution, a reception possible resolution of a facsimile apparatus on the other end of a line, a transmission resolution, and the like, and  
5 other kinds of information.

The control procedure in the facsimile apparatus according to this embodiment will be described below.

Figs. 2 to 4 are flow charts showing the control procedure in the facsimile apparatus of this embodiment.  
10 In Fig. 2, it is monitored in step S1 if an incoming call is detected. If YES in step S1, normal reception processing is performed in step S21. However, if NO in step S1, an input from the keyboard 5 is monitored in step S2 to determine if a key input for designating a  
15 resolution is made. If YES in step S2, information indicating the designated resolution is displayed on the first display unit 6 in step S3. The resolution information is displayed by the following method. That is, lamps corresponding to available resolutions are  
20 arranged on the first display unit 6, only the lamp corresponding to the designated resolution is turned on, and other lamps are kept off, thus informing the designation resolution to an operator.

In step S4, it is monitored whether or not a key  
25 input for instructing a reading operation is made at the keyboard 5. If NO in step S4, it is determined that an

operator wants to change the reading resolution designated in step S2, and the flow returns to step S2 since the resolution can be changed before the reading instruction is input. However, if YES in step S4, the  
5 value indicating the reading resolution designated in step S2 is stored in a reading resolution information area (not shown) in the RAM 19 in step S5. In step S6, an instruction is supplied to the scanner controller 12 to cause the scanner 2 to read an original at the  
10 designated resolution, and the read image data is stored in the image memory 14.

It is monitored in step S7 whether a calling instruction is input. If YES in step S7, it is checked in step S8 whether an image to be transmitted is stored  
15 in the image memory 14. If YES in step S8, a dial number input from the keyboard 5 is accepted in step S9, and a calling request signal 21 is sent to a facsimile apparatus on the other end of the line through the communication controller 16 and the communication line  
20 4.

If it is determined in step S2 that no resolution designation is made, the flow jumps to step S7. If it is determined in step S7 that a calling instruction is detected, since an image to be transmitted is not stored  
25 (since steps S5 and S6 are not executed), NO is determined in step S8, and the flow returns to step S1.



After the calling request signal 21 is sent in step S9 in Fig. 2, the control waits for an incoming call accept signal from the facsimile apparatus on the other end of the line in step S10 in Fig. 3 (see the signal sequence chart of Fig. 5). If an incoming call accept signal is received, a capability value inquiry signal is sent in step S11. When a capability value information signal is received in step S12, the flow advances to step S13 to analyze resolution information included in the capability value information signal according to the format shown in Fig. 6. The analysis result is stored in a reception possible resolution information area (not shown) in the RAM 19.

In step S14, a transmission resolution is discriminated by a method to be described later, and the discrimination result is written in a transmission resolution information area (not shown) in the RAM 19. In step S15, the contents of the reading resolution information area and the transmission resolution information area are compared with each other. If the contents in these areas coincide with each other, the flow jumps to step S17. However, if the contents do not coincide with each other, resolution conversion is performed in step S16, and thereafter, the flow advances to step S17. In step S17, the actual transmission resolution is displayed on the second display unit 7.

Note that details of the processing in step S17 will be described later.

In step S18, image data is transmitted. After the transmission of the image data is ended, a release request signal is sent in step S19 in Fig. 4. In step S20, the controller waits for a response from the facsimile apparatus on the other end of the line. When a release confirmation signal is received, this processing is ended.

10       The transmission resolution discrimination processing in step S14 in Fig. 3 will be described in detail below with reference to the flow chart shown in Fig. 7. In this embodiment, as a value indicating each resolution, a larger value is assigned as the resolution becomes denser. Fig. 8 shows the internal arrangement of the RAM 19 for temporarily storing resolution information. In the flow chart shown in Fig. 7, contents indicated by addresses of the RAM 19 are expressed by the addresses with parentheses.

20       In Fig. 7, in step S61, transmission resolution information 42 corresponding to an address as shown in Fig. 8 is initialized to a value corresponding to an indispensable resolution in the facsimile communication standard. In step S62, the value of an index indicating  
25 pieces of reception possible resolution information ( $A_1$ ) to ( $A_N$ ) is set to be "1". In step S63, it is checked if

the index value ( $A_n$ ) is equal or smaller than a maximum value  $N$ . If YES in step S63, reception possible resolution information ( $A(A_n)$ ) corresponding to the index value is compared with a reading resolution ( $A_R$ ) in step S64. If  $(A(A_n)) \leq (A_R)$ , the flow advances to step S65. In step S65, it is checked if  $(A(A_n)) \geq (A_S)$ . If YES in step S65,  $(A(A_n))$  is written in  $(A_S)$  in step S66, and the index value ( $A_n$ ) is incremented in step S67. Thereafter, the flow returns to step S63. These processing operations are repeated until  $(A_n) > N$  is satisfied.

With this processing, resolution information, the value of which is equal to or smaller than the reading resolution, and is maximum (densest) within a range of a reception resolution information can be determined as transmission resolution information. On the other hand, if it is determined in step S64 that  $(A(A_n)) > (A_R)$ , since the reception resolution is higher than the reading resolution, its value is not used as the transmission resolution. If it is determined in step S65 that  $(A(A_n)) < (A_S)$ , since the reception resolution is lower than the maximum resolution already searched in the previous step, its value is not used as the transmission resolution.

The flow chart of Fig. 9 shows details of step S17 in Fig. 3. In Fig. 9, in step S71, transmission

resolution information ( $A_S$ ) and reading resolution  
information ( $A_R$ ) are compared with each other. If the  
two pieces of information do not coincide with each  
other, the flow advances to step S72, and a message  
5 corresponding to the transmission resolution information  
is displayed on the second display unit 7.

If YES in step S71, the flow returns without  
displaying resolution information.

In this manner, when a resolution of a facsimile  
10 apparatus on the other end of the line is within a range  
capable of receiving data from a transmission side and  
the maximum value of an original reading resolution  
designated by an operator is determined as a  
transmission resolution and when the designated reading  
15 resolution and the actual transmission resolution are  
different from each other, the transmission resolution  
is visually displayed. Thus, when the reading  
resolution is changed upon transmission, an operator can  
adequately recognize the change state.

20 In the above embodiment, only when the reading  
resolution does not coincide with the transmission  
resolution, the transmission resolution is displayed.  
It is permissible to adopt an arrangement in which, when  
the reading resolution does not coincide with the  
25 transmission resolution, the display of the transmission  
resolution may be caused to flash at a predetermined

cycle; when the two resolutions coincide with each other, the transmission resolution may be continuously displayed. In this manner, a coincidence/non-coincidence between the reading resolution and the  
5 transmission resolution can be more clearly informed.

Further, an arrangement can be adopted in which the transmission information displayed on the second display unit may be a pattern such as a pictorial pattern according to resolution information or a lamp indication  
10 corresponding to the resolution in place of characters.

As many apparently widely different embodiments of the present invention can be made without departing from the spirit and scope thereof, it is to be understood that the invention is not limited to the specific  
15 embodiments thereof except as defined in the appended claims.

WHAT IS CLAIMED IS:

1. A facsimile apparatus for reading an original at a designated resolution, comprising:

means for identifying a reception possible

5 resolution of a reception-side facsimile apparatus;

discrimination means for discriminating whether or not the designated original reading resolution coincides with the reception possible resolution;

conversion means for, when said discrimination  
10 means determines that the two resolutions do not coincide with each other, converting the designated original reading resolution into the reception possible resolution; and

display means for displaying the converted  
15 resolution as a transmission resolution.

2. The apparatus according to claim 1, wherein said conversion means determines a maximum value of reception possible resolutions, which value is less than or equal to the original reading resolution, as the reception  
20 possible resolution.

3. The apparatus according to claim 1, wherein said display means displays the transmission resolution only when the reception possible resolution does not coincide with the designated original reading resolution.

25 4. The apparatus according to claim 1, wherein said display means simultaneously displays the designated

original reading resolution and the transmission resolution.

5. The apparatus according to claim 1, wherein said display means displays the transmission resolution using  
5 a predetermined pictorial pattern.

6. A facsimile apparatus in which image resolution can be converted prior to transmission, in which the resolution at which the image is actually transmitted is displayed on a display means.

-15-

**Patents Act 1977**  
**Examiner's report to the Comptroller under**  
**Section 17 (The Search Report)**

Application number

GB 9212023.7

**Relevant Technical fields**

(i) UK CI (Edition K ) H4F FDB FEX

(ii) Int CI (Edition 5 ) H04N 1/32 1/40

**Search Examiner**

M K REES

**Databases (see over)**

(i) UK Patent Office

(ii) ONLINE DATABASE: WPI

**Date of Search**

27 AUGUST 1992

Documents considered relevant following a search in respect of claims

1-6

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
A, F	EP A2 0483969 (CANON) (06.05.92) See Figures 2-4; column 3, line 54 - column 5, line 57	1, 6
A	WO A1 86/05055 (ADVANCED MICRO DEVICES) See abstract; Figure 2	1, 6
&, A, P	US 5075784 (CANON) (24.12.91) See Figure 3; column 4, lines 10-14	1, 6
&, A	JP A 0330571 (CANON)	1, 6
A	US 4814894 (CANON) See whole document	1, 6



Category	Identity of document and relevant passages	Relevant to claim(s)

#### Categories of documents

**X:** Document indicating lack of novelty or of inventive step.

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**A:** Document indicating technological background and/or state of the art.

**P:** Document published on or after the declared priority date but before the filing date of the present application.

**E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.

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